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From a paper by M. Smicroff, published in the *Izvestia*, it is evident that the climate of the Caucasus is quite continental. The average annual mean temperatures are 5° 4′ Cels. at Alexanderpol, 8° 5′ at Stavropol, 12° 6′ at Tiflis, and 14° 3′ to 14° 5′ at Bakou, Lenkoran, Kutais, Poti, and Redut-kaleh, but the yearly range of the average diurnal temperature is in most cases from 20 to 30°. The highest temperature observed was 38° 5′ at Tiflis, the lowest —25° 6′ at Stavropol. It is only in Southern Transcaucasia that localities are found where the temperature does not fall below —10°. The southern limit of the region beyond which temperatures lower than —20° are not found runs from the Crimea to the Caucasus range, and along the northern slope of the last towards Khiva, Tashkend, and Peking. The greatest range of temperature observed was 60° 4′ at Stavropol, while at Redut-kaleh it is reduced to 41° 6′. Large though this range is, it is small compared with that of Yakutsk, which varies from +38° 8′ in summer to —62° in winter.

M. Balkashin, in the *Izvestia*, concludes that the Kirghiz are a federation of several nomad tribes that formerly ranged from Southern Russia to Lake Baikal, and were mingled together by Genghiz Khan and his successors.

M. Grigorieff, in the *Izvestia*, shows that Henriette island is the land sighted by Hedenström and Sannikoff from New Siberia in 1810, and that Bennett island was seen by Sannikoff from the northern coast of New Siberia in 1811. Thus the discoveries of the ill-starred *Jeannette* are reduced to *nil.*

GEOLOGY AND PALÆONTOLOGY.

A NEW PLIOCENE FORMATION IN THE SNAKE RIVER VALLEY.—In 1870 the Smithsonian Institution submitted to me for determination a series of specimens of fishes which had been obtained by Mr. Clarence King, then in charge of the U. S. Geological Survey of the 40th parallel, in the south-western part of Idaho Territory. As a result of my examination I published descriptions of eleven species of fresh-water fishes,[1] and three of Astaci. The first specimens derived from this formation were sent by Dr. J. S. Newberry to Dr. Leidy, who described two species of fishes. Subsequently Professor Condon, of the University of Oregon, discovered the formation with some of its fossils on Willow creek, in Eastern Oregon, fifty miles north-west of the original locality. In 1880 I sent Mr. J. L. Wortman to this region, and he obtained twenty-two species from these and other localities, of which ten were new to science. He also procured bones of two species of

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[1] On Cretaceous and Tertiary Reptilia and Fishes, by Professor E. D. Cope, November, 1870, Proceedings Amer. Philos. Society.

Mammalia. The following list shows the character of the fish fauna:

Percidæ	1	species.
Cottidæ	4	"
Salmonidæ	1	"
Cyprinidæ	11	"
Catostomidæ	2	"
Cobitidæ	1	"
Siluridæ	1	"
Raiidæ	1	"
Total	22	"

Of the above, all differ from existing species so far as known, but three of the species which represent the Percidæ, the Cobitidæ, and the Siluridæ, respectively, have not been exactly determined. All the species differ from those of the Oregon lake (or Lake Lahontan as it may prove to be). Of the families, all are existing, and all are represented on the North American continent excepting the Cobitidæ, which are now confined to Eurasia.

But of these eight families four are not now found in the American waters which empty into the Pacific ocean, viz., the Percidæ, Siluridæ, and Cobitidæ and Raiidæ, excepting that there is one species of the Percidæ in California. Five of the seven families have not yet been found in the Oregon fossil lake basin, but as two of them (Salmonidæ, Cottidæ) are found in the existing lakes of that region, they will probably be found in that deposit.

The above evidence is sufficient to prove that the Idaho Pliocene formation is distinct from any formation previously known, and that it is older than the Oregon lake deposit.

In addition to the fishes, three species of crayfishes were discovered in this formation by Capt. Clarence King. These I named[1] *Astacus subgrundialis*, *A. chenoderma*, and *A. breviforceps*.

The mollusks of this formation have been described by F. B. Meek, and they, like the fishes, determine it to be lacustrine and fresh, as already stated by Professor Newberry. The species are stated by Meek[2] to be distinct specifically, and in some cases generically, from all others hitherto described from the West. Leidy observes[3] that Mammalian remains received from Capt. King's expedition include portions of *Mastodon* and *Equus excelsus*.

Mr. Wortman obtained teeth and bones of the latter, and a cannon bone of an undetermined ruminant of the size of the *Cervus elaphus*.

The ungual phalange of an edentate allied to Megalonyx was obtained from the same horizon and locality.

Mr. Wortman informs me that the bone bed is sandy, and is both overlaid and underlaid by clay rocks of little hardness. The formation covers several hundred square miles in this body.—*E. D. Cope.*

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[1] Proceedings Amer. Philos. Society, 1870, p. 605. Loc. cit., Nov., 1870.

[2] Proceedings Acad. Nat. Sci., Phila., 1870, 56.

[3] L. c., 1870, 67.

THE "THIRD TROCHANTER" OF THE DINOSAURS.—M. L. Dollo has recently instituted a comparison between the trochanters upon the femur of Iguanodon and those of Anas, Bernicla and Cygnus, and announces his conclusion that the so-called "third trochanter" of the former (and of other Dinosaurs) is found also in the avian genera mentioned. The great resemblance between the dinosaurian and avian femur was noted by Huxley in 1870, and has been generally admitted, but the absence, in most birds, of the third trochanter, which is so conspicuous a crest in Iguanodon, has been a difficulty.

M. Dollo figures, side by side, the femur of *Cygnus atratus* and that of *Iguanodon bernissartensis*, and the proof is evident that the bird possesses the same trochanter—the position is the same, the form very similar, but the size relatively far inferior.

Dissection proved that the duck's third trochanter serves for the insertion of the caudo-femoral muscle, which, as shown by Meckel, is the agent in the curious lateral movements made by the tail of the duck; and also for the insertion of the ischio-femoral muscle.

The difference in the relative dimensions of the trochanters is, therefore, correlated with the difference in size of the tails of the two animals. The enormous tail of the Iguanodon needed for its movement a massive muscle, instead of the thin slip present in the duck and swan.

Hesperornis, a bird so reptilian in many respects, ought, therefore, to have this trochanter, and M. Dollo remarks that although Professor Marsh did not note its significance, it is plainly shown in Plate XIII of that author's work on the Odontornithes.

This trochanter cannot be homologized with either of the three trochanters found in mammals, since it serves for the insertion of a totally different set of muscles from those attached to either of them, and M. Dollo therefore proposes to distinguish it as the "fourth trochanter."

THE PUERCO FAUNA IN FRANCE.—Dr. Lemoine has published the second part of his Researches on the Fossil Birds of the Inferior Tertiary of the neighborhood of Reims. In an introduction he distinguishes the two faunæ of the north of France, which represent the beginning of the Tertiary, the Cernaysienne and the Suessonienne. These correspond with remarkable equality to the Puerco and the Wasatch faunæ, which I discovered on this continent. Not a few of the genera are common to the two continents, but the extent of the identity cannot be fully understood in the present state of our knowledge of the respective forms. Those of the Cernaysian fauna, as given by Lemoine, are the following: *Mammalia:* Heteroborus, Hyodectes, Hyænodictis, Lophiodochœrus(?), Pleuraspidotherium, Plesiadapis, Adapisorex, Ptilodus; *Reptilia:* Champsosaurus, crocodiles, turtles and Lacertilia; *Aves: Gastornis edwardsi, Remornis heberti, Eupterornis remensis* Of the above, two genera, Ptilodus and Champsosaurus appear to be absolutely identical in France and New Mexico; some of the others have near allies in New Mexico, but of identity there is not yet certain evidence.

In Europe, as in America, the Suessonian epoch ushers in the genus Coryphodon. Hyracotherium also appears (*Pachynolophus gaudryi* Lem., is a Hyracotherium), and Pliolophus. A number of other genera are probably identical in North America and France, as Miacis, Opisthotomus, Phenacodus, and Pantolestes, with Lophiodon and Dichobune, not yet found in America. Hyænodictis and Plesiadapis hold over from the Cernaysian fauna.

Uniformity of nomenclature requires that the Suessonian, introduced by D'Orbigny, should replace the name Wasatch, which was given by Hayden many years later.[1] In like manner the Cernaysienne of Lemoine is identical with the Puerco of Cope, and the latter name has six or seven years priority. So also the genera Ptilodus[2] and Champsosaurus[3] were named first in America.

The genus Gastornis proves to be one of the most remarkable which palæontology has brought to light. It is the only bird known, in which the cranial sutures are persistent, and it has indications of a tooth in the position of the canine of the Mammalia. It is nevertheless a true carinate bird with reduced wings and complete tarsometatarse. The height of the *G. edwardsi* is about two and a half meters.

Note.—Since the above was written a well illustrated paper from the Bulletin of the Geological Society of France has come to hand, which describes the species of Neoplagiaulax Lem. The type, *N. eocænus*, differs from the *Ptilodus medιævus* in lacking the third premolar tooth from the lower jaw.—*E. D. Cope.*

MINERALOGY.[4]

EMPHOLITE, A NEW MINERAL.—M. L.-J. Igelström[5] has recently described a new mineral from Hörrsjöberg, Sweden, which, occurring in minute, generally microscopic crystals, has received the name empholite, from ἐμφωλεύω, to hide.

The crystals are white, transparent, and very brilliant, having a hardness of 6 or over, and belonging to the orthorhombic system. They have an easy cleavage parallel to the crystallographic

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[1] See AMERICAN NATURALIST, 1877, p. 95.

[2] This genus was described in the NATURALIST for Nov., 1881 (published October 28). The first description of the genus in France (as *Neoplagiaulax* Lem.) bears date Nov., 1882, although its discovery was announced in 1880.

[3] Proceeds. Philadelphia Academy, Dec., 1876. Described by Gervais as *Simædosaurus*, Journal de Zoölogie, Feb., 1877.

[4] Edited by Professor H. CARVILL LEWIS, Academy of Natural Sciences, Philadelphia, to whom communications, papers for review, etc., should be sent.

[5] Bull. Soc. Min. de France, T. VI, p. 40.